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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
SONG, JASMINE	
ART UNIT	**PAPER NUMBER**
2188	

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n No.	Applicant(s)	
	10/027,397	RANKIN ET AL.	
	Examin r	Art Unit	
	Jasmine Song	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondenc address --

Period f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

1. This office action is in response to Amendment filed on 08/30/2004. Claims 1-27 are still pending. All rejections and objections not explicitly repeated below are withdrawn.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

3. The rejections of claims 1-27 under 102 (e) have been maintained and updated as shown below.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claim 1-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Bealkowski et al., US Patent 6,330,656 B1.

Regarding claim 1, Bealkowski teaches that a method comprising receiving a request to remove a hot plug module from a running computing device (Fig.8A, step 805-810, removing a hot plug module is taught as removing a particular slot, col.9, lines 64-66);

updating a snoop filter of the running computing device to cease snooping of the hot plug module (it is taught as the operating system disables the device in the slot via the PCI configuration registers and reprogram partition descriptor to eliminate membership from designated partition; Fig.8A, steps 820-825, col.10, lines 1-18).

Regarding claim 2, Bealkowski further teaches that updating comprises updating the snoop filter to indicate that the hot plug module is no longer a valid snooping agent (col.10, lines 10-14, it is taught as the device is inactive and prevent the device from participating in bus activity).

Regarding claim 3, Bealkowski further teaches that updating comprises updating a valid vector (it is taught as the bit is set in the PCI command register, col.10, lines 11) to indicate that the hot plug module is not a valid snooping agent (col.10, lines 10-12).

Regarding claim 4, Bealkowski further teaches that updating comprises disabling the snoop filter associated with the hot plug module (col.10, lines 8-18).

Regarding claim 5, Bealkowski further teaches that updating comprises marking all cache lines tracked by the snoop filter as not being present in the hot plug module (Fig.5, col.9, lines 14-24).

Regarding claim 6, Bealkowski further teaches that updating comprises updating presence vectors to indicate that associated cache lines are not present in the hot plug module (Fig.7A and 7B, step 720-725 and 765-770).

Regarding claim 7, Bealkowski teaches that a midplane comprising

a plurality of couplers (Fig.3, core logic 320) to detachably couple hot plug modules (PCI host Bridge and PCI slots) to a running computing device; and

a switch (FET switches as shown in Fig,4) to interconnect the plurality of couplers and to cease issuing snoop transactions to a coupler of the plurality of couplers associated with a hot plug module to be removed from the running computing device (col.6, lines 51-67 and Fig.8A and 9).

Regarding claim 8, Bealkowski teaches that the switch causes the hot plug module to be removed to write modified cache lines to a memory of the running computing device (Fig.7A, col.9, lines 25-49).

Regarding claim 9, Bealkowski teaches that the switch comprises a valid vector (it is taught as the bit is set in the PCI command register, col.10, lines 11) and the switch issues snoop transactions only to couplers that the valid vector indicates are associated with valid snooping agents (Fig.7A and 7B).

Regarding claim 10, Bealkowski teaches that the switch comprises presence vector associated with cache lines of the hot plug module to be removed, and the switch updates the presence vectors to indicate that the hot plug module does not have copies of the associated cache lines (col.10, lines 10-14, it is taught as the device is inactive and prevent the device from participating in bus activity).

Regarding claim 11, Bealkowski teaches that the switch comprises a different snoop filter for each coupler of the plurality of couplers and the switch disables the snoop filter for the coupler associated with the hot plug module to be removed (it is taught as the operating system disables the device in the slot via the PCI configuration registers and reprogram partition descriptor to eliminate membership from designated partition; Fig.8A, steps 820-825, col.10, lines 1-18).

Regarding claim 12, Bealkowski teaches that further comprising another switch to interconnect the plurality of couplers, wherein the switches collectively track states of cache lines of hot plug modules coupled to the couplers (Fig.3) and cease to issue snoop transactions to the coupler associated with the hot plug module to be removed (it

is taught as the operating system disables the device in the slot via the PCI configuration registers and reprogram partition descriptor to eliminate membership from designated partition; Fig.8A, steps 820-825, col.10, lines 1-18).

Regarding claim 13, Bealkowski teaches that a machine readable medium processing snoop transactions comprising a plurality of instructions that in response to being executed result in a computing device (Fig.3) causing caching agents associated with a coupler of the computing device (col.8, lines 60 to col.9, lines 12) to write back modified lines to a memory of the computing device (col.4, lines 60-64) and updating a valid vector to indicate that the coupler is no longer associated with one or more valid caching agents (it is taught as the operating system disables the device in the slot via the PCI configuration registers and reprogram partition descriptor to eliminate membership from designated partition; Fig.8A, steps 820-825, col.10, lines 1-18).

Regarding claim 14, Bealkowski teaches further result in the computing device updating the valid vector in response to a hot plug removal request (Fig.7A, steps 720-725).

Regarding claim 15, Bealkowski teaches further result in the computing device updating the valid vector to indicate that another coupler of the computing device is now associated with one or more valid caching agents in response to a hot plug addition request (Fig.8B and 10A).

Regarding claim 16, Bealkowski teaches further result in the computing device clearing a bit of the valid vector that is associated with the coupler to indicate that the coupler is no longer associated with one or more valid caching agents (col.10, lines 10-14, it is taught as the device is inactive and prevent the device from participating in bus activity), and setting another bit of the valid vector that is associated with the another coupler to indicate that the another coupler is associated with one or more valid caching agents (Fig.7A and 7B, step 720-725 and 765-770).

Regarding claim 17, Bealkowski teaches that a computing device comprising,

a memory (Fig.3),

a hot plug module comprising a coupler (Fig.3, core logic 320) and one or more caching agents (each processors and associated caches) having cached lines of the memory; a midplane comprising a plurality of couplers (Fig.3, core logic 320) to detachably couple hot plug modules (PCI host Bridge and PCI slots) to a running computing device; and a snoop filter to track the cached lines of the one or more caching agents (Fig.7A and 7B, step 720-725 and 765-770); and a processor coupled to the hot plug module via the midplane, the processor to cause the snoop filter to mark the one or more caching agents as invalid snooping agents in response to a request to remove the hot plug module (col.10, lines 10-14, it is taught as the device is inactive and prevent the device from participating in bus activity).

Regarding claim 18, Bealkowski teaches that the hot plug module comprises a mechanism to generate the request to remove the hot plug module (Fig.8A, step 805-810, removing a hot plug module is taught as removing a particular slot, col.9, lines 64-66).

Regarding claim 19, Bealkowski teaches that the memory comprises a plurality of instructions that in response to being executed result in the request to remove the hot plug module being generated (Fig.8A, step 805-810, removing a hot plug module is taught as removing a particular slot, col.9, lines 64-66).

Regarding claim 20, Bealkowski teaches that the one or more caching agents (processors) comprises a processor and one or more associated memory caches (Fig.1).

Regarding claim 21, Bealkowski teaches that the one or more caching agents comprises an input/output hub and one or more associated memory caches (Fig.3 and 4).

Regarding claims 22-23, Bealkowski teaches that a snoop filter comprising storage to store coherency information for lines cached by caching agents of hot plug module (Fig.3 and 4, col.8, lines 52-59) and a controller to update the coherency

information in response to a request to remove and add a hot plug module from a computing device (Fig.7A and 7B, step 720-725 and 765-770).

Regarding claim 24, Bealkowski teaches that the controller updates the coherency information to indicate that the hot plug module is no longer a valid snooping agent in response to the request to remove the hot plug module (col.10, lines 10-14, it is taught as the device is inactive and prevent the device from participating in bus activity).

Regarding claim 25, Bealkowski teaches that the controller updates a valid vector of the coherency information to indicate that the hot plug module is no longer a valid snooping agent in response to the request to remove the hot plug module (col.10, lines 10-14, it is taught as the device is inactive and prevent the device from participating in bus activity).

Regarding claim 26, Bealkowski teaches that the controller updates the coherency information by marking all tracked cache as not being present in the hot plug module in response to the request to remove the hot plug module (Fig.5, col.9, lines 14-24).

Regarding claim 27, Bealkowski teaches that the controller updates the coherency information by updating presence vectors to indicate that associated cache

lines are not present in the hot plug module in response to the request to remove the hot plug module (Fig.7A and 7B, step 720-725 and 765-770).

Response to Applicant's Arguments

6. Applicant's arguments filed 08/30/2004 have been fully considered but they are not persuasive.

In response to applicant's arguments (claim 1) that Bealkowski does not teach that the processors have hot plug capabilities and Bealkowski make no mention of removing from or adding a processor to a running system, however, it is noted that the hot plug modules not only refer to processors, but also refer to memory, input/output hub, and /or firmware that provide the computing device with processing, storage, I/O, firmware, and/or other resources (please refer back to the applicant's specification page 4, lines 10-13), therefore, claim 1 broadly claimed removing a hot plug module is met by the Bealkowski's reference, which discloses removing a PCI slot and the operating system initiates a hot-plug event (Fig.8A). In other words, the applicant does not claim removing or adding **a processor** in claim 1, the applicant claims removing **a hot plug module** which can be a PCI slot.

In response to applicant's arguments (claim 1) that Bealkowski does not teach a snoop filter, however, it is noted that a snoop filter 329 is taught in Fig.3, which is designed to limit the amount of snoop transactions between the buses of any two processors (actually, it is taught as limit the amount of snoop transactions between two cache agents since each processor has a cache as shown in Fig.1).

In response to applicant's arguments (claims 1,17 and 22) that Bealkowski does not teach updating a snoop filter of a running computing device to cease snooping of a hot plug module, however, it is noted that this limitation is taught as the operating system disables the device in the slot via the PCI configuration registers and reprogram partition descriptor to eliminate membership from designated partition, once the membership of the partition is changed, PCI host Bridge will deliver a reply to the initiating processor the that the hot plug transaction has completed and updated the information within the cache memory which means updating a snoop filter (col.10, lines 1-18 and col.4, lines 38-44 and lines 57-64).

In response to applicant's arguments (claim 7) that Bealkowski does not teach removing the processors from a running computer system, however, it is noted that the hot plug modules not only refer to processors, but also refer to memory, input/output hub, and /or firmware that provide the computing device with processing, storage, I/O, firmware, and/or other resources (please refer back to the applicant's specification page 4, lines 10-13), therefore, claim 1 broadly claimed removing a hot plug module is met by the Bealkowski's reference, which discloses removing a PCI slot and the operating system initiates a hot-plug event (Fig.8A). In other words, the applicant does not claim removing or adding **a processor** in claim 7, the applicant claims removing **a hot plug module** which can be a PCI slot.

In response to applicant's arguments (claims 13 and 17) that Bealkowski does not teach one or more caching agents, however, it is noted that outbound transactions are initiated by an agent on the I/O bus, meaning either from the core logic(one behalf

of one of the eight processors), this agents mean cache agents which is within the processors (col.4, lines 40-43).

In response to applicant's arguments (claims 13) that Bealkowski does not indicate that the PCI agents write back modified lines to memory prior to being removed from a partition, however, it is noted that this limitation is taught as PHB will deliver a reply to the processor that the hot plug transaction is completed after the read or write transaction completes on the PCI bus (col.4, lines 60-64).

7. When responding to the office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. 1.111 (c).

8. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jasmine Song whose telephone number is 571-272-4213. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone

numbers for the organization where this application or proceeding is assigned are 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Mano Padmanabhan 12/27/04

Jasmine Song

Patent Examiner

December 23, 2004

Mano Padmanabhan

Supervisory Patent Examiner

Technology Center 2100

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER